MAP GQ-1614

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

GEOLOGIC MAP OF THE DIAMOND PEAK QUADRANGLE, LARIMER COUNTY, COLORADO, AND ALBANY COUNTY, WYOMING

By William A. Braddock, James C. Cole, and David H. Eggler

GEOLOGIC QUADRANGLE MAP
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U.S. GEOLOGICAL SURVEY

Base from U.S. Geological Survey, 1967
10,000-foot grids based on Colorado coordinate system, north zone and Wyoming coordinate system, east zone
1,000-meter Universal Transverse Mercator grid ticks, zone 13, shown in blue

SCALE 1:24 000
1 MILE
1 KILOMETER
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

COLORADO
QUADRANGLE LOCATION

See index to geologic mapping

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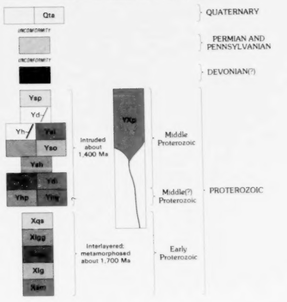
CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

[Names of igneous rocks are after Streckeisen, 1976]

Qal **Alluvium (Quaternary)**—Unconsolidated silt, sand, and gravel. Includes colluvium along valley walls

Qta **Talus (Quaternary)**—Boulders of granitic gneiss and hornblende gneiss at base of cliffs

PPf **Fountain Formation (Lower Permian and Upper and Middle Pennsylvanian)**—Reddish-brown to purplish-gray and white arkosic conglomerate, medium- to coarse-grained arkosic sandstone, and dark-reddish-brown siltstone and shale. Only the lower part of the formation crops out at the northern edge of the quadrangle

Kimberlite (Devonian?)—Dark-gray, greenish-black, or dark-green, massive, porphyritic kimberlite, kimberlite breccia, and carbonatitic kimberlite breccia (detailed description of kimberlite matrix in Smith and others, 1979). Forms dikes, plugs, and diatremes in northeast corner of quadrangle. Fragments of Ordovician and Silurian limestone occur in some diatremes (Chronic and others, 1969). Fission-track dating of zircons indicates a probable Devonian age (Naeser and McCallum, 1977)

INTRUSIVE IGNEOUS ROCKS
(MIDDLE PROTEROZOIC)

Ysp **Silver Plume Granite**—Fine- to medium-grained, equigranular to seriate, porphyritic biotite-muscovite granite. Northern limit of Log Cabin batholith (of Silver Plume Granite) is along southern margin of quadrangle. Whole-rock Rb-Sr age is 1,390±30 Ma (recalculated from Peterman and others, 1968, p. 2290, using IUGS decay constants in Steiger and Jäger, 1977)

Yd-/ **Mafic dikes**—Gray to black, fine- to medium-grained rocks generally containing zoned, clouded, and altered plagioclase phenocrysts. Texture commonly subophitic but may be hypidiomorphic-granular. Both biotite and hornblende are abundant. A mafic dike in northwest corner of Livermore quadrangle (see index map) is cut by pegmatite of assumed Silver Plume age. Mafic dikes in north-central part of Livermore Mountain quadrangle (see index map) are cut by pegmatite of assumed Silver Plume age and by Silver Plume Granite (Ysp)

Yh-/ **Hornblende granite**—Pink, fine- to medium-grained, equigranular, contains scattered clusters of hornblende and biotite. Color index is about 6 percent. Occurs as dikes. Hornblende granite is cut by mafic dikes (Yd) in southern Wyoming (See Eggler, 1968, plate 3, where pad = Yd, hmd = Yh). Hornblende granite cuts main phase of Sherman Granite (Ysh) in northeast part of quadrangle

Ysi **Alaskite**—Pink to red, fine-grained biotite granite aplite. Forms dikes generally parallel to margin of Virginia Dale ring structure. Alaskite dikes are cut by mafic dikes (Yd) near northwest corner of Virginia Dale quadrangle. Alaskite dikes cut inner Cap Rock phase of Sherman Granite (Ysi) in northeast corner of Cherokee Park quadrangle and cut outer Cap Rock phase (Yso) in northwest part of Virginia Dale quadrangle

Sherman Granite—Forms Sherman batholith, which crops out in most of Cherokee Park quadrangle and most of Virginia Dale quadrangle; northern part of this quadrangle, and northward from these quadrangles into southern Wyoming. Virginia Dale ring structure occurs along southern margin of the batholith. Sherman Granite has been subdivided (Eggler, 1967, 1968) into inner and outer Cap Rock phases, which occur within the ring structure, and the main phase (the "Trail Creek granite facies" of Eggler, 1968), which forms most of the batholith and the outermost ring of the ring structure. Chemical analyses of Sherman Granite (and associated rocks) are published in Eggler (1968) and Galipeau and Ragland (1979). Whole-rock Rb-Sr age of the main phase is 1,430±20 Ma (Zielinski and others, 1981)

Ysi **Inner Cap Rock phase**—Pinkish-gray, porphyritic biotite monzogranite. Foliation defined by oriented, tabular, microcline phenocrysts, biotite-rich streaks, and oriented, tabular inclusions. Crops out in one small area in northeast part of quadrangle. Cut by a stock of Silver Plume Granite (Ysp), by mafic and alaskite dikes (Yd) and (Yal) in northeast part of Cherokee Park quadrangle, and by mafic and biotite monzogranite dikes (Yd) and (Yb) in the northwest part of Cherokee Park quadrangle

Yso **Outer Cap Rock phase**—Similar to inner Cap Rock phase (Ysi), but phenocrysts are smaller, planar orientation of phenocrysts better, and biotite streaks more abundant. Contact between inner and outer Cap Rock phases gradational over several hundred meters. Cut by bodies of Silver Plume Granite (Ysp) near Turkey Roost in southern part of Cherokee Park quadrangle, by mafic dikes (Yd) in sec. 6, T. 11 N., R. 72 W. in this quadrangle, and by alaskite dikes (Yal) in northwest part of Virginia Dale quadrangle

Ysh **Main phase**—Red to pink, coarse-grained, equigranular granite composed of quartz, microcline, oligoclase, and 5–10 percent hornblende and biotite. Cut by bodies of Silver Plume Granite (Ysp) near Turkey Roost in southern part of Cherokee Park quadrangle, mafic dikes (Yd) in southwest part of Virginia Dale quadrangle and northwest part of this quadrangle, and by dikes of outer Cap Rock phase (Yso) in sec. 1, T. 11 N., R. 73 W. in this quadrangle

Dioritic rocks of Virginia Dale ring structure—A discontinuous, arcuate body of dioritic rock occurs in eastern and southern part of ring structure. Fine-grained diorite and diorite crop out on the east side of this quadrangle just north of Trail Creek. Dioritic rocks are cut by Silver Plume Granite (Ysp) in southeast part of Cherokee Park quadrangle and by alaskite (Yal) in Virginia Dale quadrangle in sec. 3, T. 11 N., R. 71 W. and sec. 34, T. 12 N., R. 71 W. Dioritic rocks are cut by many small bodies and dikes of outer Cap Rock phase of Sherman Granite (Yso) in the Virginia Dale and Cherokee Park quadrangles and appear to be sharply cut by main phase of the Sherman Granite (Ysh) along inner contact of the outer ring dike in Virginia Dale quadrangle

Yhp **Fine-grained diorite**—Black, subophitic to ophitic, composed of andesine, hornblende, biotite, and opaque minerals

Yhg **Diorite**—Black to gray, medium-grained, subophitic, ophitic, or hypidiomorphic-granular; composed of andesine, hornblende, biotite, quartz, microcline, and opaque minerals

Composite zone of the Virginia Dale ring structure—This zone is the arcuate mass between the outer Cap Rock monzogranite (Yso) and the outer ring dike composed of the main phase of Sherman Granite (Ysh). Zone consists mostly of dioritic rocks, older quartzofeldspathic mica schist (Xqs), and hornblende gneiss (Xam). Many dikes and lenses of outer Cap Rock phase (Yso) cut the composite zone, but only larger ones are mapped. Adjacent to these dikes and lenses, hybrid rocks intermediate in composition between monzogranite and diorite occur and may have formed by reaction between monzogranite and host rocks—possibly involving mobilization (Eggler, 1968), or they may have formed by mixing of simultaneously intruded diorite and monzogranite magmas (Ray Wilcox, U.S. Geological Survey, oral commun., 1970). These hybrid rocks have not been separately mapped

INTRUSIVE IGNEOUS ROCKS
(MIDDLE? PROTEROZOIC)

Yhp **Porphyritic hornblende monzogranite**—Tan to reddish-tan, fine-grained, xenomorphic, granular, contains phenocrysts predominantly of quartz but some microcline and sparse oligoclase. Hornblende and biotite comprise about 5 percent of the rock. Monzogranite is cut by hornblende granite dikes (Yhi) in the northeast part of quadrangle, by alaskite dikes (Yal) in northwest corner of Virginia Dale quadrangle, and by main phase of Sherman Granite (Ysh) in northwest corner of that quadrangle and in northeast part of this quadrangle. Maximum relative age of monzogranite not known because it cuts only Early Proterozoic metamorphic rocks (it is in contact with hornblende gabbro (Yhg), but no relative age criteria were observed)

Yhg **Hornblende gabbro**—Black, medium-grained, nonfoliated, composed of hornblende, labradorite, and minor biotite and pyrite. Has ophitic to subophitic texture. Occurs in several small bodies in secs. 35 and 36, T. 12 N., R. 73 W. Hornblende gabbro cut by mafic dikes (Yd), porphyritic alaskite dikes (Ypal), alaskite dikes (Yal), and by main phase of Sherman Granite (Ysh) in northwest corner of Virginia Dale quadrangle. Maximum relative age unknown

YXp **Pegmatite (Middle? and Early Proterozoic)**—Fine-grained to very coarse grained. Both Middle and Early Proterozoic pegmatites occur, but are not clearly distinguishable from each other

METASEDIMENTARY AND METAVOLCANIC ROCKS (EARLY PROTEROZOIC)

Mica schist (Xqs) is metasedimentary; granitic gneisses (Xigg, Xbgg) and hornblende gneiss and amphibolite (Xam) probably are metavolcanic rocks. These rocks have been metamorphosed to upper amphibolite facies. The schists are migmatitic and are characterized by the mineral assemblage of sillimanite-microcline-plagioclase-quartz-biotite-magnetite ± garnet. Regional metamorphism dated at 1,713±30 Ma (whole-rock Rb-Sr age recalculated from Peterman and others, 1968, p. 2284, using IUGS decay constants in Steiger and Jäger, 1977). Time of deposition cannot be much older, because Sm-Nd isotope analyses are consistent with a model age of 1,800 Ma for formation of continental crust in Colorado (DePaolo, 1981)

Xqs **Quartzofeldspathic mica schist**—Biotite schist interbedded with quartzofeldspathic granofels. Migmatitic

Xigg **Granitic gneiss**—Gray, pink, or red, weakly to strongly foliated, composed mostly of plagioclase, quartz, microcline, and generally less than 15 percent dark minerals

Xlgg **Leucocratic granitic gneiss**—Dominantly fine-grained. Some aplitic layers almost devoid of dark minerals, some layers contain very little microcline, and some grade into hornblende gneiss. Foliation due to fine-scale compositional layering and to oriented biotite

Xbgg **Biotite granitic gneiss**—Dominantly medium-grained. Biotite content averages about 10 percent. Garnet is sparse. Mafic mineral aggregates are strongly foliated in anastomosing seams and elongate, flattened, discoid groups that are uniformly distributed in rock. Ovoid microcline grains or quartz-feldspar aggregates form prominent augen in places. Contacts with adjacent metamorphic rocks generally concordant but discordant in places

Xlg **Leucocratic gneissic pegmatite**—White to pink, fine-grained to very coarse grained, weakly foliated gneiss composed of quartz, plagioclase, and microcline. Crops out in one body in southeast corner of quadrangle

Xam **Hornblende gneiss and amphibolite**—Dark-gray to black, weakly to strongly layered; composed chiefly of hornblende and plagioclase. Contains thin layers and pods of white to light-green calc-silicate gneiss

Contact—Approximately located

Fault or fracture zone—Dashed where approximately located, dotted where concealed

GEOLOGIC QUADRANGLE MAP
DIAMOND PEAK QUADRANGLE, COLORADO
GQ–1614

Fold—Showing approximate trace of axial surface, and bearing and plunge of hinge lines where known. Dashed where inferred, dotted where projected through younger units, queried where existence is hypothetical. Orientation of hinge lines, estimated from stereographic plots of foliation and lineation measurements, shown as follows:

70 **Bearing and plunge of hinge lines in an inclined axial surface**

Hinge lines vertical
Form of folds, which may change along trace, shown by following symbols

Antiform

Overturned antiform

Synform

Overturned synform

Neutral fold—Showing direction of curvature of layers in hinge (a neutral fold has no crest or trough lines)

Strike and dip of foliations—May be combined with lineation symbols

Schistosity
Inclined

Vertical

Folded—Showing map view and dip of long limbs

Primary flow foliation in intrusive igneous rocks

Bearing and plunge of lineations—May be combined with foliation symbols

Axes of multiple symmetric folds—Showing map view of fold. Approximate orientation shown by symbol without dip value

Small folds, boudinage, and aligned minerals
Inclined

25 **Horizontal**

Mine or prospect

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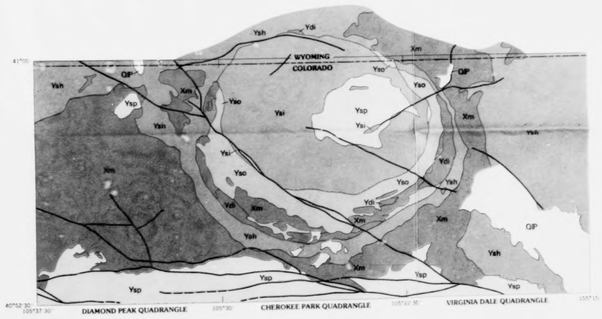
INDEX TO GEOLOGIC MAPPING



EXPLANATION

QP Quaternary, Permian, and Pennsylvanian rocks

Ysp Silver Plume Granite

Ysi Sherman Granite, inner Cap Rock phase

Yso Sherman Granite, outer Cap Rock phase

Ysh Sherman Granite, main phase

Yhg Dioritic rocks

Xm Principally metamorphic rocks

Contact

Fault or fracture zone—Dashed where approximately located

INDEX MAP SHOWING THE VIRGINIA DALE RING STRUCTURE

INDEX MAP SHOWING PUBLISHED 1:24,000-SCALE GEOLOGIC MAPS, NORTHEAST FRONT RANGE, COLORADO

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